

Response to the Invited Reader's Comments

by M. Aykut Attar

I thank the invited reader for his/her comments on my paper. Some of the issues raised by the invited reader are indeed noteworthy, and I provide below a discussion of these issues.

Neoclassical vs. Evolutionary Premises

1. My paper aims to contribute to a research program that evolved from the Neoclassical Theory of Economic Growth of 1950s and 1960s into the Unified Growth Theory (UGT) of 2000s. This evolution witnessed, with the rise of endogenous growth theory, the dismissal of the naive view of technological progress — the one which presumes that technological progress is exogenous. The models of endogenous growth, however, were designed to explain *growth*, and explaining persistent poverty in the 20th century was possible only through the models of poverty traps. The UGT's purpose is to unify these two paradigms for a rigorous explanation of both stagnation and growth (and the transition from the former to the latter).
2. While some contributions to the UGT literature — such as those of Galor and Moav (2002) and Galor and Michalopoulos (2012) — exploit some evolutionary principles, the theoretical work in the UGT literature presupposes (dynamic) *optimization* by rational *individuals* and (dynamic) *equilibrium*. The same is true for my paper, and I do not attempt to construct an alternative to the ontological foundation of where the UGT originates from.
3. The invited reader's emphasis on the role of tacit knowledge is to the point as the creation of and the access to the tacit component of useful knowledge may affect the individual behavior. While Mokyr's (2002) theory that has partially inspired the model of my paper has evolutionary foundations as well, the model does not make a sharp distinction between tacit and codified forms of knowledge.

The New Economy Considerations à la Quah

1. In a series of papers, Danny Quah has emphasized the switch from the economy of objects and arm-power to the economy of weightless and non-rival intangibles such as knowledge and human capital. One of the main messages is that the consumers of knowledge-intensive products play a key role in increasing the usefulness of the product as the total number of consumers increases; not only the supply factors in the production of knowledge-intensive products but also the demand-related ones matter for the new economy's success in increasing human welfare.
2. While useful knowledge conceptualized in the model of my paper is formed by weightless and non-rival discoveries, an increasing number of users of this knowledge, i.e., entrepreneurs, does not affect the usefulness within a generation but only means a larger stock of useful discoveries to be enjoyed by the entrepreneurs of the next generation. Extending the model with this notion could be an interesting avenue for future research.

3. Regarding the spatial division the reader refers to, the model of my paper does not tell much about *where* the innovation activity is located. In reality, the first Industrial Revolution in Britain is characterized by regional diversity as the North developed into an industrial region but the South did not. An interesting question is whether the characteristics emphasized by Danny Quah, along with the receptiveness and the responsiveness of potential entrepreneurs, played a role in determining the regional disparities during the (first) Industrial Revolution.

Knowledge Spillovers

1. As indicated by the invited reader, knowledge spillovers matter for economic growth and development. Endogenous growth theory has originated, not surprisingly, from revolutionary extensions of Kenneth Arrow and Hirofumi Uzawa's Marshallian externality models respectively by Paul Romer and Robert Lucas, and the literature has started appreciating Schumpeterian creative destruction only later. While I find it difficult, unlike the invited reader, to associate Richard Goodwin's model of growth and cycles with my paper, leading papers on knowledge spillovers could be cited in a revised version.
2. Two ways through which knowledge spillovers affect innovativeness are Marshall-Arrow-Romer (MAR) externalities and Jacobs diversification (see, e.g., van der Panne, 2004). Knowledge spillovers occur across the firms within an industry in the case of MAR externalities whereas Jacobian diversification emphasize the complementarity of the knowledge created in one particular sector to other sectors.
3. Since the model of my paper has one innovating sector, i.e., the manufacturing sector, where firms enjoy the positive externality associated with the stock of useful discoveries, it comes close to MAR externalities. On the other hand, a multi-sector extension of the model would incorporate Jacobian diversification if innovating firms in different industries uses the same stock of useful discoveries as basic research that precedes product/process development.

Innovation-Prone vs. Innovation-Averse Societies

1. Rodríguez-Pose (1999) studies the performance of European regions in transforming R & D to economic growth. He finds that, while innovation-prone regions are heterogeneous, innovation-averse ones have commonalities such as labor market rigidities, the lack of skills, and the low participation of women.
2. The concepts of Innovation-Prone and Innovation-Averse are useful as they can be applied historically to pre-modern economies as well. Besides, not only the economic and the social factors but a priori decisive political and cultural determinants would be of interest.
3. My paper includes a discussion in Section 6.3 on why England in mid-1700s was an innovation-prone society and why China was an innovation-averse one. In general, I think, the lack of data and the difficulties in the formal modeling of non-economic factors restrict the scope of the analysis.

References

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